

ASSIGNMENT 4

Textbook Assignment: "Internal Combustion Engine," chapter 12, pages 12-1 through 12-23 and "Power Trains," chapter 13, pages 13-1 through 13-18.

- 4-1. An internal combustion engine is a machine that converts
1. heat energy to mechanical energy through the burning of a liquid fuel
 2. mechanical energy to heat energy through the burning of a liquid fuel
 3. mechanical energy to heat energy through the burning of a fuel-air mixture within itself
 4. heat energy to mechanical energy through the burning of a fuel-air mixture within itself
- 4-2. All internal combustion engines rely on which of the following three things?
1. Oil, water, and air
 2. Fuel, water, and ignition
 3. Air, fuel, and ignition
 4. Air, ignition, and water
- 4-3. In the operation of a gasoline engine, what event forces each piston downward?
1. Compression of fuel-air mixture
 2. Intake of fuel-air mixture
 3. Expansion of heated gases
 4. Exhaust of waste gases
- 4-4. What are the four basic parts of a 1-cylinder internal combustion engine?
1. Crankshaft, piston, connecting rod, and cylinder
 2. Piston, crankpin, cylinder, and crankshaft bearing
 3. Crankshaft bearing, cylinder, connecting rod, and exhaust port
 4. Cylinder, intake port, exhaust port, and piston
- 4-5. In what order do the strokes of a 4-stroke Otto-cycle engine occur during operation?
1. Compression, power, exhaust, intake
 2. Compression, power, intake, exhaust
 3. Intake, compression, power, exhaust
 4. Intake, compression, exhaust, power
- 4-6. During which complete stroke of a gasoline engine is the cylinder pressure less than atmospheric pressure?
1. Compression
 2. Power
 3. Intake
 4. Exhaust
- 4-7. Which of the following events occurs during a compression stroke in the 4-stroke Otto-cycle engine?
1. A partial vacuum is created
 2. Waste gases are exhausted
 3. Volume of air-fuel mixture decreases
 4. Temperature of air-fuel mixture decreases
- 4-8. How are the pressure and temperature affected in an engine cylinder as the air-fuel mixture is compressed?
1. Pressure and temperature decrease
 2. Pressure and temperature increase
 3. Pressure decreases; temperature increases
 4. Pressure increases temperature decreases

- 4-9. During what stroke in the operating cycle of a 4-stroke Otto-cycle engine is the greatest force exerted on the piston head?
1. Intake
 2. Compression
 3. Power
 4. Exhaust
- 4-10. Which of the following events occurs during the exhaust stroke in a 4-stroke Otto-cycle engine?
1. Fuel-,air-mixture is ignited
 2. Temperature and pressure of mixture increases
 3. A partial vacuum is created
 4. Burnt gasses are cleared from the cylinder
- 4-11. The basic difference between the 2-stroke-cycle and the 4-stroke-cycle diesel engine is in the
1. number of pistons
 2. piston arrangement
 3. number of piston strokes during a cycle of events
 4. distance is piston travels during a stroke
- 4-12. How many crankshaft revolutions are required for each power stroke in a (a) 4-cycle engine and (b) 2-cycle engine?
1. (a) Two (b) one
 2. (a) Four (b) two
 3. (a) One (b) two
 4. (a) Two (b) four
- 4-13. Which, if any, of the following components determine(s) the position of the valves?
1. The pistons
 2. The camshaft
 3. The crankshaft
 4. None of the above
- 4-14. The ignition system is timed so that the spark occurs before the piston reaches TDC on which of the following strokes?
1. Exhaust
 2. Intake
 3. Power
 4. Compression
- 4-15. Which of the following engine classification methods is the most common?
1. Type of fuel used
 2. Cylinder arrangement
 3. Valve arrangement
 4. Type of cooling used
- 4-16. Combustion takes place as a result of ignition by what in a (a) diesel engine and (b) gasoline engine?
1. (a) Expansion of compressed gases
(b) a Spark
 2. (a) Heat of compression
(b) a spark
 3. (a) A spark
(b) heat of compression
 4. (a) A spark
(b) expansion of compressed gases

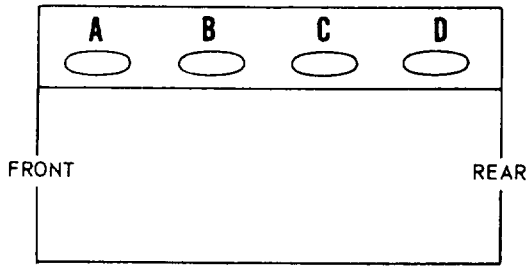


Figure 4A

IN ANSWERING QUESTION 4-17, REFER TO FIGURE 4A.

4-17. The digits in the firing order of an engine are the cylinder numbers. If the firing order of the engine of figure 4A is 1-4-2-3, in which order do the cylinders fire?

1. A, B, C, D
2. A, C, B, D
3. A, D, B, C
4. A, D, C, B

4-18. How does the camshaft actuate the intake and exhaust valves of an L-head engine?

1. By tappets from a position above the valves
2. By tappets from a position below the valves
3. By tappets, pushrods, and rocker arms from a position above the valves
4. By tappets, pushrods, and rocker arms from a position below the valves

4-19. Which of the following is NOT considered to be a stationary part of an engine?

1. The piston assembly
2. The cylinder block
3. The crankcase
4. The cylinder head

4-20. Cylinder sleeves for the blocks of gasoline and diesel engines are used for which of the following purposes?

1. To decrease the wear of the cylinder blocks
2. To strengthen the cylinder blocks
3. To help enclose the heat in the cylinder blocks
4. To help make a seal to contain the oil within the cylinder blocks

4-21. The curved surface of the pockets in which the valves of an L-head cylinder head function are designed for which of the following purposes?

1. To shorten the compression stroke
2. To lengthen the compression stroke
3. To decrease the turbulence of the air-fuel mixture
4. To increase the turbulence of the air-fuel mixture

4-22. Which of the following components supports and encloses the crankshaft and provides a reservoir for the lubricating oil?

1. The cylinder head
2. The exhaust manifold
3. The intake manifold
4. The crankcase

4-23. The waste products of combustion are carried from the cylinders through which of the following means?

1. The intake manifold
2. The exhaust manifold
3. The cylinder head
4. The cylinder block

- 4-24. Downward motion of the pistons is converted to rotary motion through the action of which of the following components?
1. The valves
 2. The gear train
 3. The flywheel and the vibration dampener
 4. The connecting rod and the crankshaft
- 4-25. Which of the following parts is NOT a structural component of a piston?
1. The ring grooves
 2. The lands
 3. The bearings
 4. The skirt
- 4-26. Aluminum pistons will expand more than cast-iron pistons under the same operating conditions. For this reason, they are designed with which of the following types of piston skirts?
1. Split skirts
 2. Full trunk skirts only
 3. Slipper skirts only
 4. Full trunk and slipper skirts
- 4-27. Which of the following parts secure(s) the piston to the connecting rod?
1. The wrist pin
 2. The split skirts
 3. The piston rings
 4. The ring grooves.
- 4-28. How do piston rings help an engine perform its work?
1. By sealing the cylinder
 2. By distributing and controlling lubricating oil on the cylinder wall
 3. By transferring heat from the piston to the cylinder wall
 4. All of the above
- 4-29. The bottom ring on the piston of textbook figure 12-15 serves which of the following purposes?
1. It scrapes combustion products from piston surfaces
 2. It transmits oil to the combustion rings
 3. It wipes excess oil from the cylinder walls
 4. It removes impurities from the oil
- 4-30. The end of the connecting rod that attaches to the piston must be fitted with a bearing of bronze! or similar material when the piston pin is a
1. full floating pin
 2. fixed pin
 3. full floating or a fixed pin
 4. semifloating pin
- 4-31. Which of the following parts may be considered the backbone of the engine?
1. The pistons
 2. The crankshaft
 3. The connecting rods
 4. The bearings
- 4-32. The vibration damper serves what purpose?
1. It balances camshaft speed with crankshaft speed
 2. It reduces twisting strain on the crankshaft
 3. It brakes the flywheel during engine speed reduction
 4. It reduces flywheel vibration

- 4-33. In addition to reducing engine speed fluctuations, the flywheel often functions in which of the following ways?
1. As a power takeoff for the camshaft and a pressure surface for the clutch
 2. As a pressure surface for the clutch and a starting system gear
 3. As a starting system gear and a power takeoff for the fuel pump
 4. As a power takeoff for the fuel pump and a timing reference for the ignition system
- 4-34. Which of the following parts is/are NOT included in the valve-actuating mechanism?
1. The pushrods
 2. The rocker arms
 3. The camshaft
 4. The crankshaft
- 4-35. What is the function of the eccentric lobes on a camshaft?
1. To open the intake and exhaust valves at the proper times
 2. To return the intake and exhaust valves to their seats
 3. To add to the pressure exerted by the valve springs
 4. To regulate the pressure exerted by the valve springs
- 4-36. Relative to engine speed, how fast does the camshaft of an 8-cylinder, 4-stroke/cycle engine turn?
1. One-eighth as fast
 2. One-fourth as fast
 3. One-half as fast
 4. Twice as fast
- 4-37. Camshaft followers are the parts of the valve-actuating mechanism that contact the camshaft. Which of the following terms is another name for camshaft followers?
1. Cam lobe
 2. Rocker arms
 3. Valve stem
 4. Valve lifters
- 4-38. Which of the following mechanisms keep the crankshaft and camshaft turning in the proper rotation to one another so that the valves open and close at the proper time?
1. The pushrods
 2. The timing gears
 3. The rocker arms
 4. The valve mechanisms
- 4-39. By what means are the timing gears at the camshaft and crankshaft positioned so they CANNOT skip?
1. They are welded
 2. They are threaded
 3. They are fire keyed
 4. They are bolted
- 4-40. In the diesel engine fuel system, which of the following component replaces the carburetor?
1. The fuel injection mechanisms
 2. The fuel pump
 3. The fuel filter
 4. All of the above
- 4-41. What power train part of a 4-wheel drive heavy truck is NOT part of a 2-wheel drive heavy truck?
1. The differential
 2. The multiple disk clutch
 3. The 4-speed transmission
 4. The transfer case
- 4-42. What is the function of the clutch in the power train of a motor vehicle that is starting to move forward from a still position?
1. To dampen vibration in the transmission system
 2. To allow the brakes to "clutch" or hold until there is enough power for the vehicle to move forward
 3. To transmit power to the wheels through the dead axles
 4. To allow the engine to take up the load gradually

- 4-43. If the spring pressure applied to the clutch driving plate is increased rapidly, what, if anything, happens to the amount of clutch slippage?
1. It increases gradually
 2. It increases rapidly
 3. It decreases rapidly
 4. Nothing
- 4-44. When a truck having a 4-speed transmission is in fourth gear, the propeller shaft and the engine crankshaft rotate at a ratio of
1. 1:1
 2. 1:2
 3. 2:1
 4. 3:2
- 4-45. A heavy truck with a 7:1 gear ratio in a 4-speed transmission is moving along at 6 miles per hour in low gear. The driver shifts the transmission through second and third to fourth gear. About how fast will the truck be moving in fourth gear if the driver keeps the engine turning at the same rate as it was turning in low gear?
1. 6 mph
 2. 30 mph
 3. 42 mph
 4. 54 mph
- 4-46. How does the constant mesh transmission reduce noise?
1. By using spur-tooth rather than helical gears
 2. By using helical rather than spur-tooth gears
 3. By using main shaft meshing gears that are able to move endwise
 4. By using soundproof padding around the transmission units
- 4-47. What is the function of the friction cone clutch in a synchromesh transmission?
1. To engage the main drive gear with the transmission main shaft
 2. To engage the first-speed main shaft with the transmission main shaft
 3. To equalize the speed of the driving and driven members
 4. To engage the second-speed main shaft with the transmission main shaft
- 4-48. The synchromesh transmission shown in figure 13-10 of your textbook engages the notches at the inner ends of the bell cranks by which of the following means?
1. Shifter forks
 2. A first-speed clutch
 3. Poppets
 4. A dog clutch
- 4-49. What device usually provides the means for engaging automatically the front-wheel drive on a 6-wheel drive vehicle?
1. The sprag unit
 2. The power takeoff
 3. The auxiliary transmission
 4. The two-way clutch
- 4-50. In an automotive vehicle the power takeoff that supplies power to the auxiliary accessories is attached to which of the following units of the power train?
1. The transmission
 2. The auxiliary transmission
 3. The transfer case
 4. Each of the above

- 4-51. One final drive part of the truck shown in figure 13-1 of your textbook is tile
1. differential carrier
 2. rear universal joint
 3. propeller shaft
 4. transmission
- 4-52. If the ring gear in a final drive has 21 teeth and the pinion has 7 teeth, the mechanism is probably part of a
1. diesel-powered shovel
 2. small tractor
 3. six-wheel truck
 4. passenger car
- 4-53. What is the primary purpose of the differential in the rear axle assembly?
1. To connect each of the rear axle shafts together
 2. To prevent each of the rear wheel axles from turning at a different speed
 3. To boost engine power transmitted to the wheels
 4. To permit both drive axles to be driven as a single unit
- 4-54. Through which parts of the differential is power transmitted directly to the axle shafts?
1. Differential case and side gears
 2. Bevel drive pinions and side gears
 3. Differential pinions and side gears
 4. Differential case and bevel drive pinons
- 4-55. What parts usually found in conventional automotive differentials are NOT contained in the no-spin differential?
1. Ring gear and spider
 2. Pinion and side gears
 3. Spring retainer and side member
 4. Driven clutch member and cam assembly
- 4-56. The rear axle housing of a certain truck helps carry the weight of the truck. Which of the following types of live axles is used in the truck?
1. Nonfloating
 2. Semifloating
 3. Three-quarter floating
 4. Each of the above

